at least one sampling platform, said sampling platform including a plurality of receptors, said plurality of receptors including at least one protein receptor and at least one nucleic acid receptor; and

an integrated circuit detector system having a plurality of detection channels for detecting electromagnetic signals related to binding events occurring at said plurality of receptors, said detection channels each including at least one detector.

43. The integrated circuit of claim 42, wherein said sampling platform comprises a solid support.

44. The integrated circuit of claim 42, wherein said plurality of targets include at least one selected from the group consisting of a bacterium, a fungus, a virus, and an eukaryotic microorganism.

45. The integrated circuit claim 42, wherein said plurality of targets include at least one selected from the group consisting of polynucleotides, polypeptides and peptides.

46. The integrated circuit claim 43, wherein said solid supporting comprises at least one selected from the group consisting of a substrate, a filter, and a membrane connected between said plurality of receptors and said integrated circuit.

47. The integrated circuit of claim 43, wherein said solid support is operable to filter certain wavelengths of electromagnetic radiation.

48. The integrated circuit of claim 43, wherein said solid support further comprises an optical filter or a lens.

49. The integrated circuit of claim 42, wherein each said plurality of receptor probes further comprises at least one selected from the group consisting of a biomimetic, a cell receptor and an intact biological cell.

50. The integrated circuit of claim 49, wherein said molecular probe comprises at least one selected from the group consisting of a chemical receptor, a bioreceptor and a biopolymer.

51. The integrated circuit of claim 49, wherein said biomimetic comprises a molecular imprint PNA or a cyclodextrin probe.

52. The integrated circuit of claim 42, further comprising at least one excitation source of electromagnetic radiation for irradiating said receptor probes, said excitation source of electromagnetic radiation comprising at least one selected from the group consisting of a light emitting diode, a diode array, a laser and a laser array.

53. The integrated circuit of claim 52, wherein said excitation source is disposed on-chip.

54. The integrated circuit of claim 52, wherein said excitation source is disposed off-chip.

55. The integrated circuit of claim 42, wherein said detection channels include a photodetector.

56. The integrated circuit of claim 55, wherein said photodetector is at least one selected from the group consisting of a photodiode, an avalanche photodiode and a phototransistor.

57. The integrated circuit of claim 42, further comprising an on-chip signal amplification system or a signal processing system.

58. The integrated circuit of claim 57, wherein said signal amplification system or said signal processing system further comprises a microprocessor or an amplifier.

59. The integrated circuit of claim 42, wherein said detection channels further comprise a transimpedence amplifier or a low-pass filter.

60. The integrated circuit of claim 42, wherein said plurality of receptors are tagged with a label that responds to incident electromagnetic radiation by emitting or absorbing distinct electromagnetic responses, each response having a different frequency.

61. The integrated circuit of claim 60, wherein said electromagnetic responses are at least one selected from the group consisting of luminescence scattering, infrared absorption and ultraviolet absorption.

62. The integrated circuit of claim 42, wherein said plurality of receptors respond to electromagnetic irradiation by radiating a luminous signal.

63. The integrated circuit of claim 62, wherein said luminous signal is in the visible or near-infrared region of the electromagnetic spectrum.

64. The integrated circuit of claim 45, wherein said polynucleotides comprises at least one selected from the group consisting of DNA, PNA and RNA.

65. The integrated circuit of claim 42, wherein the detection channels further comprises an amplifier.

66. The integrated circuit of claim 42, wherein said detection channels include optical detectors and amplifiers, said optical detectors and amplifiers being integrated on a single circuit.

67. The integrated circuit of claim 42, wherein the plurality of detection channels comprises an array of *n*-well amplifier photodiodes.

68. A method for the simultaneous detection of a plurality of diverse targets in a sample, said method comprising the steps of:

contacting said integrated circuit of claim 42 with said sample; and

detecting for the presence of output signals from said receptors, wherein the presence of said output signals is indicative of at least one of said diverse targets in said sample.

69. A method for detecting a plurality of different pathogens in a sample, comprising the steps of:

contacting said integrated circuit of claim 42 with said sample, wherein one or more of said receptors is specific for each of said pathogens; and

generating an output signal from each of said receptors when said pathogens are present in said sample.--